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NASA Procedural Requirements

COMPLIANCE IS MANDATORY**NPR 8820.2E**Effective Date: October 07,
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Subject: Facility Project Implementation Guide

Responsible Office: Facilities Engineering and Real Property Division

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CHAPTER 1: An Overview of NASA's Facilities Program

The Vision

The NASA vision is to "improve life here, to extend life to there, and to find life beyond". The mission statement says: NASA will understand the Earth's system and its response to natural and human-induced changes; NASA will enable a safe, secure, efficient and environmentally friendly air transportation system; and NASA will invest in technologies and collaborate with others to improve quality of life and create a secure world. NASA's facilities program supports these vision and mission statements by improving life in the workplace, reducing energy consumption, right sizing our workspace, and maximizing sustainability concepts (reduce, reuse, recycle).

The Legacy

Recognizing the fundamental reliance NASA missions impose upon their supporting facilities, Section 203(c)(3) of the National Aeronautics and Space Act of 1958, as amended, provides the authority for NASA to independently manage its facilities program, or as specifically stated in the Act: "to acquire (by purchase, lease, condemnation, or otherwise), construct, improve, repair, operate, and maintain laboratories, research testing sites and facilities." Relatively few Federal agencies have such broad latitude. The facility engineering professionals who have provided that support since NASA's inception have planned, designed, constructed, operated, maintained, repaired, and restored a physical plant that is unique in the world.

That plant presently includes more than 5,000 facilities with over 42 million square feet and a current replacement value in excess of \$20 billion. NASA Centers and Component Facilities occupy more than 100,000 acres of Federal land located at 15 primary sites around the country. Significant facilities are also maintained at several overseas locations. Many of these facilities, such as the massive research wind tunnels constructed in the aftermath of World War II, the rocket development, launch/mission control complexes of the Apollo era, and the redesign from the Apollo expendable rocket to the reusable Space Shuttle are considered to be among the most significant and successful accomplishments in the history of the engineering profession.

The Challenge

NASA's mission today remains as challenging as ever, and both its current and future needs for a large, complex, and reliable physical plant are as great as ever. Missions currently in planning involve such issues as interplanetary human space flight, collection and analysis of extraterrestrial materials, investigations into the origins of the universe, and research leading to the next generation of civilian and military aircraft. They will undoubtedly result in a need for new supporting facilities every bit as significant and demanding as the historical precedents mentioned above.

To meet this continuing challenge, NASA must maintain its independent ability to manage the acquisition, maintenance, and repair of the physical plant with a facility engineering staff capable of performing to the highest possible standards of the profession.

Successful accomplishment of NASA missions requires all of its employees and contractors to constantly work at the cutting edge of their profession. This guidebook provides explicit details regarding the process by which NASA facility professionals must plan, program, design, construct and activate facility projects. Ultimate success of that process, however, relies upon a nurturing environment that provides the following:

- a. Recognizes professional achievement and credibility such as professional registration and participation in professional societies,
- b. Encourages participation in research activities such as the CII, Federal Facility Council, American Society of Civil Engineers (ASCE), American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE), National Fire Protection Association (NFPA), Society of American Military Engineers (SAME) and many others,
- c. Is open to new ideas, change, and accepts managed risk, and
- d. Exploits opportunity to network and share ideas up, down, and across the Agency, thus, leveraging the extraordinary talents of the individuals involved.

Such an environment has allowed NASA's facilities engineers to successfully adopt and implement forward-thinking facility policies and practices such as Partnering/Teambuilding, Preproject Planning, Value Engineering, Reliability Centered Maintenance, Predictive Testing Procedures, Constructability, Sustainable Building Design, and Performance-Based Contracting. Other similar practice initiatives are currently being studied for adoption. All are fundamental to the successful conduct of facility acquisition management as detailed in the following chapters of this guide.

1.1 Organizational Roles

1.1.1 NASA Headquarters Role. Agency leadership is the major function of NASA Headquarters. In performing this function for the facilities program, Headquarters is responsible for the following:

- a. Providing external communication and accountability to the Administration, Congress, and oversight agencies,
- b. Integrating the Agency budget,
- c. Establishing long-term investment strategy,
- d. Establishing NASA policy and standards,
- e. Ensuring functional management,
- f. Allocating resources,
- g. Setting goals across Enterprises, and
- h. Providing for central services across the Agency.

1.1.2 Headquarters Facilities Engineering Division Role. The Division provides functional leadership for all Agency facility engineering programs including facility design, construction, maintenance, and real estate. The goal of this leadership is to have reliable facilities available at minimum cost for NASA programs. The Division is pursuing improvements in construction and maintenance to provide the latest state-of-the-art and cost-effective facilities by participating with other Government agencies and external associations. In accomplishing its leadership role, the Division is responsible for the following:

- a. Real estate policy, utilization, guidance, and reporting,
- b. Facility management systems including:
 - (1) Specifications-Kept-Intact (SPECSINTACT) - the NASA standard facility construction specification system,
 - (2) Facility Project Management System (FPMS), and
 - (3) Automated Real Property reporting systems.
- c. Center facilities and real estate master planning policy and guidance,
- d. CoF Budget Advocacy, Development, Policy, and Standards, Fiduciary Accountability, Resources, Program Oversight, and Analysis,
- e. Facility Project Management policies,
- f. Facility Maintenance Policy, Guidance, and Leadership, and
- g. Consultant to the NASA Administrator, Chief Financial Officer (CFO), Enterprises, other Headquarters Organizations, and Centers on facilities matters.

1.1.3 Headquarters Enterprises and Institutional Program Offices (IPO) Role. In the facilities program, these offices are responsible for the following:

- a. Formulating program requirements and objectives,
- b. Allocating resources for facilities within the context of Agency strategic determinations,
- c. Providing Program Office budget guidelines,
- d. Determining requirements with Centers, and
- e. Determining with Centers candidate projects for inclusion in the proposed budget.

1.1.4 Office of Safety and Mission Assurance Role. This Office is responsible for supporting the Headquarters Facilities Engineering Division in ensuring that a facility system safety program is being implemented at all NASA Centers, Installations, and Component Facilities in accordance with NASA STD 8719.7, Facility System Safety Guidebook. The Headquarters Office of Safety and Mission Assurance shall participate in the review, evaluation, and prioritization of facilities safety projects and corrective actions to ensure that all facility hazards are being eliminated or otherwise appropriately mitigated. Priorities for facilities safety projects and corrective actions will be coordinated with the Enterprise Offices, IPO's, and NASA Centers during the budget process.

1.1.5 NASA Centers. As stated in [NASA Policy Directive \(NPD\) 1000.1C](#), NASA Strategic Plan, "NASA's Centers are responsible for the safety and occupational health of their workforce and for the safe implementation of the Agency plans, programs, and activities of the Strategic Enterprises." In fulfilling its roles, the Centers are responsible for utilizing, revitalizing, maintaining existing facilities, and developing, planning, budgeting, designing, and constructing new facilities to support the Strategic Enterprises.

1.2 This Guide

NASA's facilities projects vary in cost and complexity. They range from multimillion dollar, state-of-the-art complex facilities to simple facility modifications valued in the thousands of dollars. This document provides NASA program and project managers guidance for managing the budget; requirements definition; project planning and development; project approval processing; and design, construction, and activation of all facility projects regardless of the dollar value or complexity. [Appendix H](#), FPIG Requirements (Must Do), provides a listing of "is/are required" and "must" requirements included in the FPIG. The requirements are presented for quick reference in tabular form providing the page, paragraph number, subject, and copy of the requirement as stated in the FPIG. Users of this quick reference should review the referenced paragraph to ensure that the statement is not taken out of context. In addition, users should review this guide for "shall" statements, which are obligations to act; "should" statements, which implies obligation or preference, but not absolute necessity; and "will" statements, which are predictions of future action. The Facilities Engineering Division's Facility Program Manager may approve variations to the requirements listed in Appendix H with proper justification. Following are overviews of the chapters included in this guide.

1.2.1 Chapter 2 NASA's Facilities Program. This chapter details NASA's facilities program content, development, documentation, approval, and execution. It explains how to develop and process Center facility projects. It describes how NASA Headquarters reviews projects and develops the facilities program for submission to the Office of Management and Budget (OMB). It includes facility project fiscal management and an overview of project implementation with reference to other chapters for details.

1.2.2 Chapter 3 Project Planning/Development. This chapter explains how project requirements are developed. It describes the requirements definition process and the required planning documents, including the functional requirements statement, concept studies, and facilities requirements document. It discusses risk management principles and use of the Project Definition Rating Index system. The chapter explains the purpose and use of Preliminary Engineering Reports (PER) and includes the values of developing a project management plan and for planning the final design.

1.2.3 Chapter 4 Design. This chapter provides details for project design and for project construction and activation planning. It includes design management; Architect-Engineer (A-E) selection; parameters, standards and considerations for inclusion in the design; preadvertisement review of contract documentation; a discussion on the types of contracts to use in implementing the designed project; and the plan and its content for activation of the project after construction.

1.2.4 Chapter 5 Construction. Following facility project design, approval, and funding, the next step is construction. This chapter covers the various aspects of managing the construction of the facility project. It includes contract bid package content; authority requirements for advertising; Contracting Officer roles and responsibilities; discussion of procurement methods, bid evaluation and contract award; preconstruction conference; management and control of the construction, including changes and cost; O&M considerations; and construction contract completion and acceptance including subsystem and system testing and facility and safety inspections.

1.2.5 Chapter 6 Activation. After construction, the final step is the installation and testing of the equipment and systems that are required for the facility to be activated for its intended use. The details of this facility outfitting and turnover of the completed facility to the user and the O&M organization are covered in this chapter.

1.3 Documentation Retention

Documentation created as a result of this guide will be considered Federal records and must be retained in accordance with NPR 1441.1, NASA Records Retention Schedules. For clarification of these requirements, contact the Center Records Manager.

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